Supplementary Course (EVA) at ZHAW School of Engineering

Title: Current Topics in Blockchains and Distributed Ledger Technology

Short Code: rEVA_BDL

Credits	3
Profile	Computer Science (CS) Business Engineering (BE) Data Science (DS) Medical Engineering (Med) Mechanical Engineering (ME) Electrical Engineering (EIE)
Responsible Institute /Centre	Institute of Data Analysis and Process Design (IDP)
Responsible lecturer and contact informtion	**Christian Badertscher (bash@zhaw.ch)**
Type and duration of examinations	The following deliverables (group work) are expected: 1. Coding project / Prototype (50%) 2. Short Documentation (2-4 pages) of the prototype (25%) 3. Short Presentation (20 min) of the project (25%)
Start date and duration	Semester: Spring Start: First week of semester. End: Final presentations in the last week of the semester.
Location	This rEVA is fully remote and we meet online by default. In-person meetings are possible if desired.

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Course type	We follow the semester rhythm. • Contact hours: 9 (hrs) • Guided self-study/coaching: 11 (hrs) • Independent self-study (project): 70 (hrs) **Breakdown:** Week 1: Overview of topics & forming groups (3 hours) Week 2: In-depth introduction into the selected topics (3 hours) Week 3. In-depth introduction into the selected topics (3 hours) Afterwards, each group is expected to meet the lecturer 1 hour per week for coaching. In the last week of the semester, the final presentation will take place.
Language of instruction	English
Short description (max. 300 characters)	Blockchain technology, or more generally the distributed ledger technology (DLT), has become a core component in critical infrastructures, as well as established itself as an active field of research & development. The goal of this rEVA is to gain a deeper understanding of the current topics in blockchain technology including zero-knowledge technology, smart contract design patterns, cross-chain activities and more. The students will first get an overview of the available focus topics and see their relevance, usage, and challenges in practice. The students will form groups and decide on their favorite topic. For the chosen topic, each group will: - Get an in-depth introduction into their topic by the lecturer - Perform (guided) self-study for finding relevant literature and documents. - Define and implement a coding project / small prototype with the purpose of gaining hands-on experience. - Write a brief documentation / report about their prototype and present it in a short presentation.

MASTER OF SCIENCE
IN ENGINEERING

Zürcher Hochschule
für Angewandte Wissenschaften

School of
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Contents and Learning Objectives	The main learning objective is that students master, in a solution-oriented way, a particular topic of high-relevance and topicality in blockchain technology and beyond (since many topics are far-reaching beyond blockchains). Beyond that, the students will see the focus topics, results, and lessons learned from other groups and hence naturally gain some further understanding of the other topics as well. A preliminary list of topics is: • Smart Contract Design Patterns for increased reliability • On-Chain Randomness Generation • Programming in the eUTxO Model • ZK-Tech: Succinct Non-Interactive Arguments of Knowledge (SNARKs) • Blockchain Bridges for cross-chain interoperability • Blockchain Rollups for efficient off-chain computations • Quantum Security: threat models and tools to defend against quantum attacks. Due to the topicality of all these topics, the list might be extended in the future - and students are free to propose a suitable topic ahead of the course.
Prerequisites	Basic knowledge in Programming. Background in Blockchain is an advantage (for example the lecture WVU.BDL at ZHAW) but can in principle be acquired during the course.
Literature	-
Special requirements	-

Offer for profiles	Aviation (Avi)	☒	Business Engineering (BE)	☒
	Computer Science (CS)	☒	Data Science (DS)	☒
	Electrical Engineering (ElE)	☒	Energy & Environment (EnEn)	☒
	Mechanical Engineering (ME)	☒	Mechatronics & Automation (MA	☒
	Medical Engineering (Med)	☒	Photonics (Pho)	☐
			Civil Engineering (CE)	☐